Chapter 3:

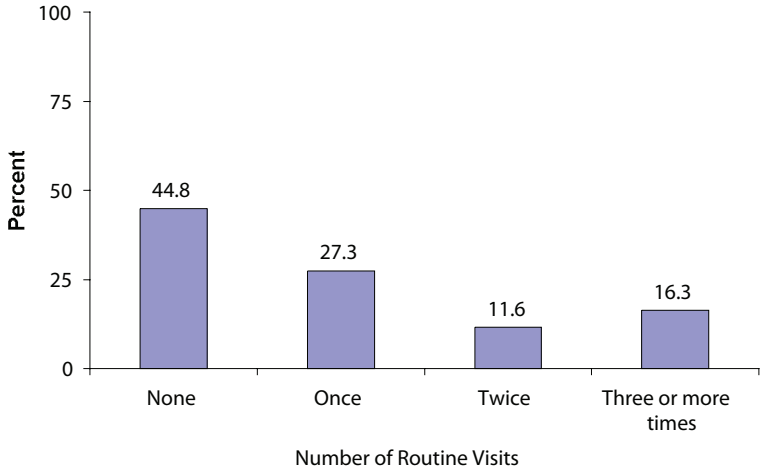
Health Care Utilization

Asthma Office Visits

Routine checkups within a personal medical home with a primary health care provider are essential for effective asthma management and control. According to the National Heart, Lung, and Blood Institute's National Asthma Education and Prevention Program Clinical Practice Guidelines, regular follow-up visits (at one to six month intervals depending on the needs of each patient over time) are essential. During each visit, clinicians need to assess whether control of asthma has been maintained, if medication needs to be changed, monitor and review action plans, and promote and support self management behaviors according to the needs of each patient.[16]

The 2005 N.C. BRFSS asked adults with current asthma *"During the past 12 months, how many times did you see a doctor, nurse or other health professional for a routine checkup for your asthma?"* The responses are detailed below.

Figure 29. How Many Times in the Past 12 Months have Persons With Asthma Seen a Health Professional for a Routine Checkup For Their Asthma[1], Adults (≥ 18 years), North Carolina, 2005



[1]Responses to the question "During the past 12 months, how many times did you see a doctor, nurse or other health professional for a routine checkup for your asthma?" Question was asked only of those who reported having asthma currently.

Table 15. Number of Routine Checkups for Asthma, Total and by Race, 2005

	None	Once	Twice	Three or more times
Total %	44.8%	27.3%	11.6%	16.3%
(95% CI)	(40.9, 48.8)	(23.9, 31.1)	(9.0, 14.7)	(13.8, 19.2)

Confidence intervals rounded to the nearest tenth
Data Source: BRFSS, North Carolina, 2005

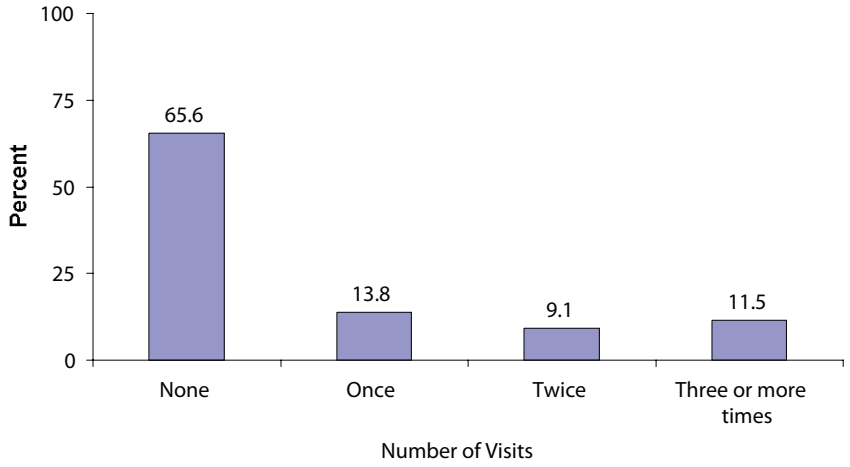
Summary of Figure 29 and Table 15:

- About 45% of North Carolina adults with current asthma have not seen a doctor or health professional for a routine checkup for their asthma in the past 12 months.

There are no significant gender differences regarding with how many times a person with asthma sees a doctor or other health professional for a routine check up of their asthma in the past 12 months.

North Carolinians with current asthma were also asked in the N.C. BRFSS whether or not they had ever visited a health professional for urgent treatment of worsening asthma symptoms.

Figure 30. How Many Times in the Past 12 Month have Persons With Asthma Visited a Health Professional (Other Than ER) For Urgent Treatment of Worsening Asthma Symptoms[1], Adults (≥ 18 years), North Carolina, 2005



[1]Responses to the question "(Besides those emergency room visits) During the past 12 months, how many times did you see a doctor, nurse or other health professional for urgent treatment of worsening asthma symptoms?" Question was asked only of those who reported having asthma currently.

Table 16. Urgent Treatment for Worsening Asthma, Total and by Race, 2005

	None	Once	Twice	Three or more times
Total %	65.6%	13.8%	9.1%	11.5%
(95% CI)	(61.6, 69.4)	(11.0, 17.3)	(6.8, 11.9)	(9.3, 14.0)

Confidence intervals rounded to the nearest tenth
Data Source: BRFSS, North Carolina, 2005

Summary of Figure 30 and Table 16:

- About 35% of North Carolinians with asthma saw a doctor or other health professional at least once in the last 12 months for urgent treatment for worsening asthma symptoms.

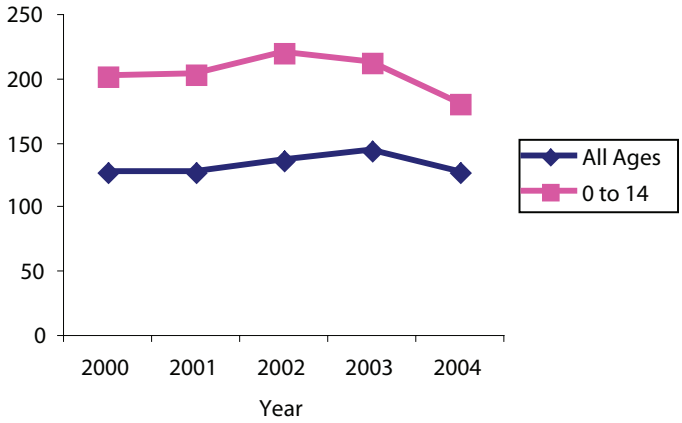
Hospitalizations

Hospitalizations due to asthma are often preventable results from uncontrolled asthma. These serious episodes of asthma are generally preventable with proper treatment and management of the disease. Therefore, hospitalizations due to asthma can be avoided with good asthma management techniques, ongoing education, and support for patients.

Inpatient hospital services represent the single largest direct medical expenditure for asthma.[40] Costs for hospitalizations due to asthma in North Carolina in 2004 exceeded $88.5 million, according to the State Center for Health Statistics. Health policy efforts to improve the effectiveness of primary care interventions for asthma within the personal medical home may reduce costs.[40]

The North Carolina Asthma Program receives hospitalization data from the State Center for Health Statistics, which receives the data from a private data processor. North Carolina hospitals are required to "submit information necessary for a review and comparison of charges, utilization patterns, and quality of medical services" (Senate Bill 345 (article 11A, 131E-214)) to a private company, Solucient, that currently acts as the statewide data processor. The patient-level information the hospitals submit is drawn from their billing databases. Several types of hospitals are not included, such as: military and veteran hospitals, ambulatories, specialty hospitals, rehabilitation facilities, psychiatric facilities, and prison hospitals. The North Carolina hospital discharge data are comprised of hospitalization information such as diagnoses, date of admittance and date of discharge, length of stay, information on the patient such as county of residence and gender, patient status at discharge, payer, and total amount billed for the hospital stay. Hospital discharge data report on hospital stays, and do not provide enough information to identify individual patients. Therefore, it can not be determined if the same person was admitted to the hospital once or several times during the reporting period.

Figure 31. Hospitalization[1,2] With a Primary Cause of Asthma per 100,000 Population, All Ages and Ages 0-14, North Carolina, 2000-2004[3]



[1]Only includes primary diagnoses of Asthma for North Carolina residents served in North Carolina hospitals.
[2]Rates may be smaller than actual asthma-related hospital use for counties that border other states.
[3]2004 Data are provisional.

YEAR	Total – All Ages Rate (Count)	Ages 0-14 Rate (Count)
2000	125.9 (10,180)	201.3 (3,364)
2001	127.0 (10,398)	203.0 (3,415)
2002	135.5 (11,281)	220.0 (3,755)
2003	143.2 (12,051)	211.5 (3633)
2004	125.9 (10,753)	180.2 (3121)

Data Source: North Carolina State Center for Health Statistics, 2000-2004

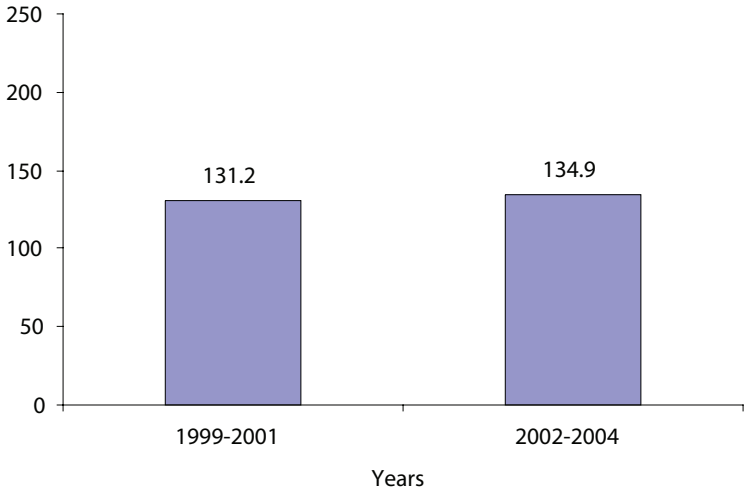
Summary of Figure 31:

- Hospitalization rates in North Carolina have remained relatively stable over the past five years.

In 2002, CDC's National Hospital Discharge Survey reported that, nationally, asthma hospitalizations (for all age groups) were at a rate 170 per 100,000.[12] North Carolina for the same year had an asthma hospitalization rate for all age groups of 135.5 per 100,000.

Aggregate Hospitalization Rates: 1999-2001 and 2002-2004

Figure 32. Hospitalizations[1,2] With a Primary Cause of Asthma per 100,000 Population, All Ages, North Carolina, 1999-2001 and 2002-2004[3]

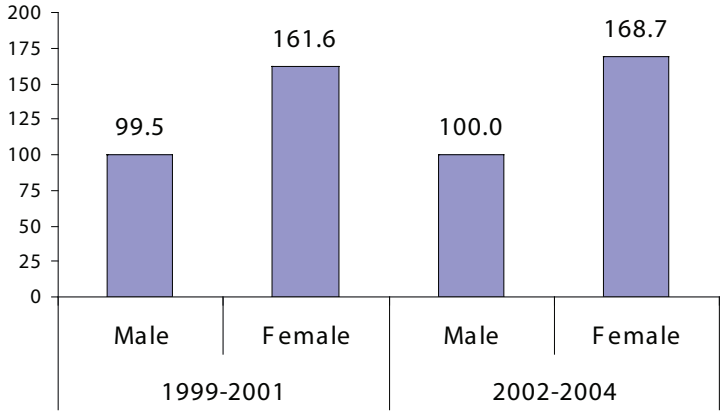


[1]Only includes primary diagnoses of Asthma for North Carolina residents served in North Carolina hospitals.
[2]Rates may be smaller than actual asthma-related hospital use for counties that border other states.
[3]2004 Data are provisional.
Data Source: North Carolina State Center for Health Statistics, 1999-2004

Summary of Figure 32:

- There was a statistically significant increase in the rate of asthma hospitalizations from 1999-2001 (131.2 per 100,000) to 2002-2004 (134.9 per 100,000).
- See Table 17 for additional information.

Figure 33. Hospitalizations[1,2] With a Primary Cause of Asthma per 100,000 Population, by Sex, All Ages, North Carolina, 1999-2001 and 2002-2004[3]



[1]Only includes primary diagnoses of Asthma for North Carolina residents served in North Carolina hospitals.
[2]Rates may be smaller than actual asthma-related hospital use for counties that border other states.
[3]2004 Data are provisional.
Data Source: North Carolina State Center for Health Statistics, 1999-2004

Summary of Figure 33:

- Females are significantly more likely to be hospitalized due to asthma than males for these periods of time.
- A significant increase is seen in the rate of asthma hospitalizations for females between 1999-2001 (161.6 per 100,000) and 2002-2004 (168.7 per 100,000).
- See Table 17 for additional information.

Figure 34a. Hospitalizations[1,2] With a Primary Cause of Asthma per 100,000 Population, by Age Group, North Carolina, 1999-2001

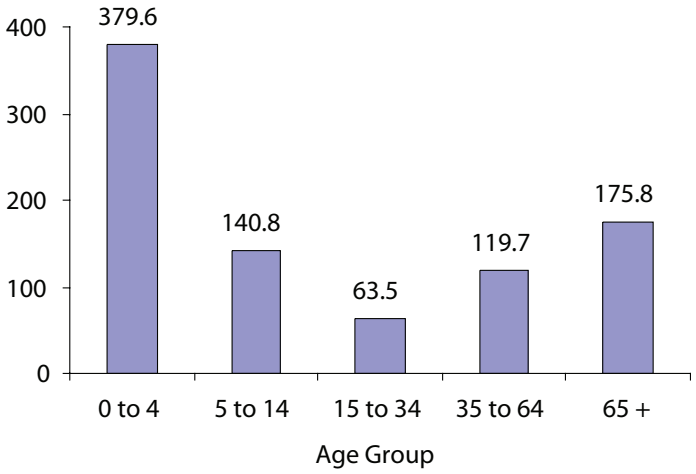
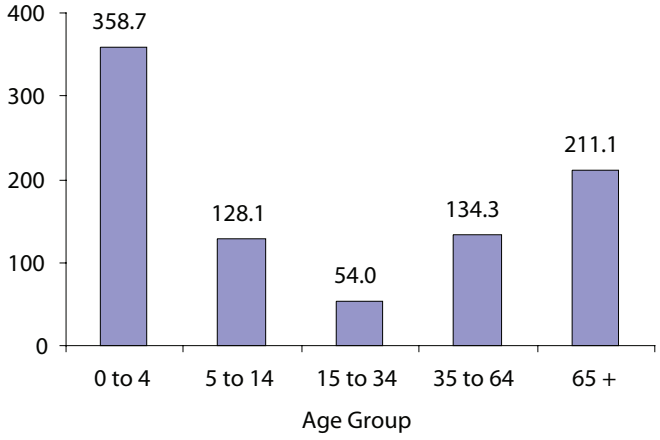


Figure 34b. Hospitalizations[1,2] With a Primary Cause of Asthma per 100,000 Population, by Age Group, North Carolina, 2002-2004[3]



[1]Only includes primary diagnoses of Asthma for North Carolina residents served in North Carolina hospitals.
[2]Rates may be smaller than actual asthma-related hospital use for counties that border other states.
[3]2004 Data are provisional.
Data Source: North Carolina State Center for Health Statistics, 1999-2004

Summary for Figures 34a and 34b:

- Children up to age four were significantly more likely than any other age group to be hospitalized due to a primary cause of asthma. They are followed by adults age 65 and older, who were significantly more likely than the remaining age groups to be hospitalized due to asthma.
- In the three year period of 2002-2004, significant decreases in hospitalization rates were seen in the age groups of 0-4 years, 5-14 years, and 15-34 years, over the three year period of 1999-2001. However, the opposite was noted for the age groups 35- 64 and 65 years and older. In these two age groups, the asthma hospitalization rates significantly increased in 2002-2004 over the rates in 1999-2001.

- See Table 17 for additional information.

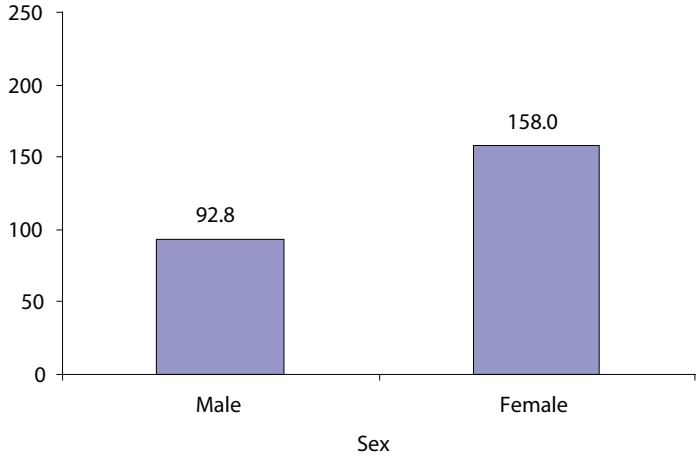
Table 17. Hospitalizations[1,2] With a Primary Cause of Asthma per 100,000 Population, by Sex and Age Group, North Carolina, 1999-2001 and 2002-2004[3]

	1999-2001	2002-2004
Total Rate	131.2	134.9
95% CI	(129.8-132.7)	(133.5- 136.4)
Count	31,793	34,115
Sex		
Male Rate	99.5	100.0
95% CI	(97.7-101.3)	(98.2-101.8)
Count	11,771	12,433
Female Rate	161.6	168.7
95% CI	(159.3- 163.8)	(166.5- 171.0)
Count	20,020	21,682
Age Group		
0 to 4 Rate	379.6	358.7
95% CI	(370.2-388.9)	(349.8-367.7)
Count	6,313	6,181
5 to 14 Rate	140.8	128.1
95% CI	(136.8- 144.9)	(124.4-131.9)
Count	4,683	4,400
15 to 34 Rate	63.5	54.0
95% CI	(61.6-65.3)	(52.3-55.7)
Count	4,404	3,903
35 to 64 Rate	119.7	134.3
95% CI	(117.5-122)	(132-136.6)
Count	11,170	13,270
65+ Rate	175.8	211.1
95% CI	(171-180.5)	(205.9-216.3)
Count	5,223	6,361

Confidence intervals rounded to the nearest tenth
[1]Only includes primary diagnoses of asthma for North Carolina Residents served in North Carolina hospitals.
[2]Rates may be smaller than actual asthma-related hospital use for counties that border other states.
[3]2004 data are provisional.
Data Source: North Carolina State Center for Health Statistics, 1999-2004

2004 Hospitalization Rates

Figure 35. Hospitalizations[1,2] with a Primary Cause of Asthma per 100,000 Population, by Sex, North Carolina, 2004[3]

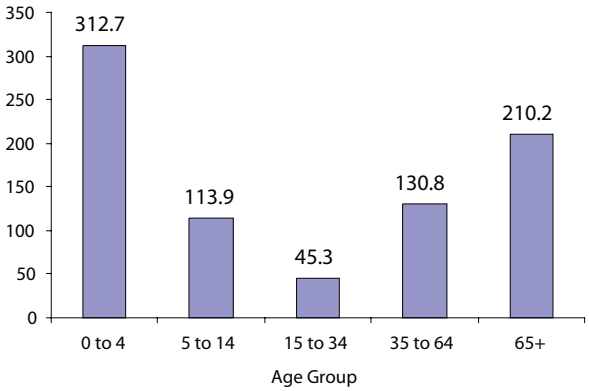


[1]Only includes primary diagnoses of asthma for North Carolina Residents served in North Carolina hospitals.
[2]Rates may be smaller than actual asthma-related hospital use for counties that border other states.
[3]2004 data are provisional.
Data Source: North Carolina State Center for Health Statistic, 2004

Summary of Figure 35:

- Females have higher hospitalization rates for asthma (158 per 100,000) than males (92.8 per 100,000).
- Asthma hospitalization rates for both male and females in North Carolina in 2004 fall below the 2002 national numbers from the National Hospital Discharge Survey (male-140 per 100,000, female-190 per 100,000).[12]

Figure 36. Hospitalizations[1,2] With a Primary Cause of Asthma per 100,000 Population, by Age, North Carolina, 2004[3]



[1]Only includes primary diagnoses of asthma for North Carolina Residents served in North Carolina hospitals.
[2]Rates may be smaller than actual asthma-related hospital use for counties that border other states.
[3]2004 data are provisional.
Data Source: North Carolina State Center for Health Statistics, 2004

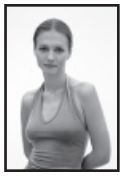
Summary of Figure 36:

- The highest asthma hospitalization rates occurred in the youngest age group, 0-4 years. The rates then steadily decreased until middle age, when they began increasing again.

Table 18. Hospitalizations[1,2] With a Primary Cause of Asthma per 100,000 Population, by Sex and Age Group, North Carolina, 2003-2004[3]

	2003	2004
Sex		
Male Rate	104.2	92.8
95% CI	(101.1- 107.3)	(89.9- 95.7)
Count	6849	3904
Female Rate	180.9	158
95% CI	(176.9-184.9)	(154.2- 161.7)
Count	7738	4313
Age Group		
0 to 4 Rate	380.7	312.7
95% CI	(364.8- 396.6)	(298.3- 327.1)
Count	2191	1807
5 to 14 Rate	126.2	113.9
95% CI	(119.6- 132.7)	(107.7- 120)
Count	1442	1314
15 to 34 Rate	58.9	45.3
95% CI	(55.8- 62)	(42.6- 48)
Count	1419	1103
35 to 64 Rate	141.4	130.8
95% CI	(137.3- 145.5)	(126.9- 134.7)
Count	4650	4392
65+ Rate	234.4	210.2
95% CI	(224.9- 243.9)	(201.2- 219.1)
Count	2349	2137

Confidence intervals rounded to the nearest tenth
[1]Only includes primary diagnoses of asthma for North Carolina Residents served in North Carolina hospitals.
[2]Rates may be smaller than actual asthma-related hospital use for counties that border other states.
[3]2004 data are provisional.
Data Source: North Carolina State Center for Health Statistics, 2003-2004



Summary of Table 18:

- The rate of hospitalizations for both males and females decreased significantly from 2003 to 2004.
- Significant decreases in 2004 asthma hospitalization rates were seen in most age groups over the 2003 rates.

Race and Ethnicity

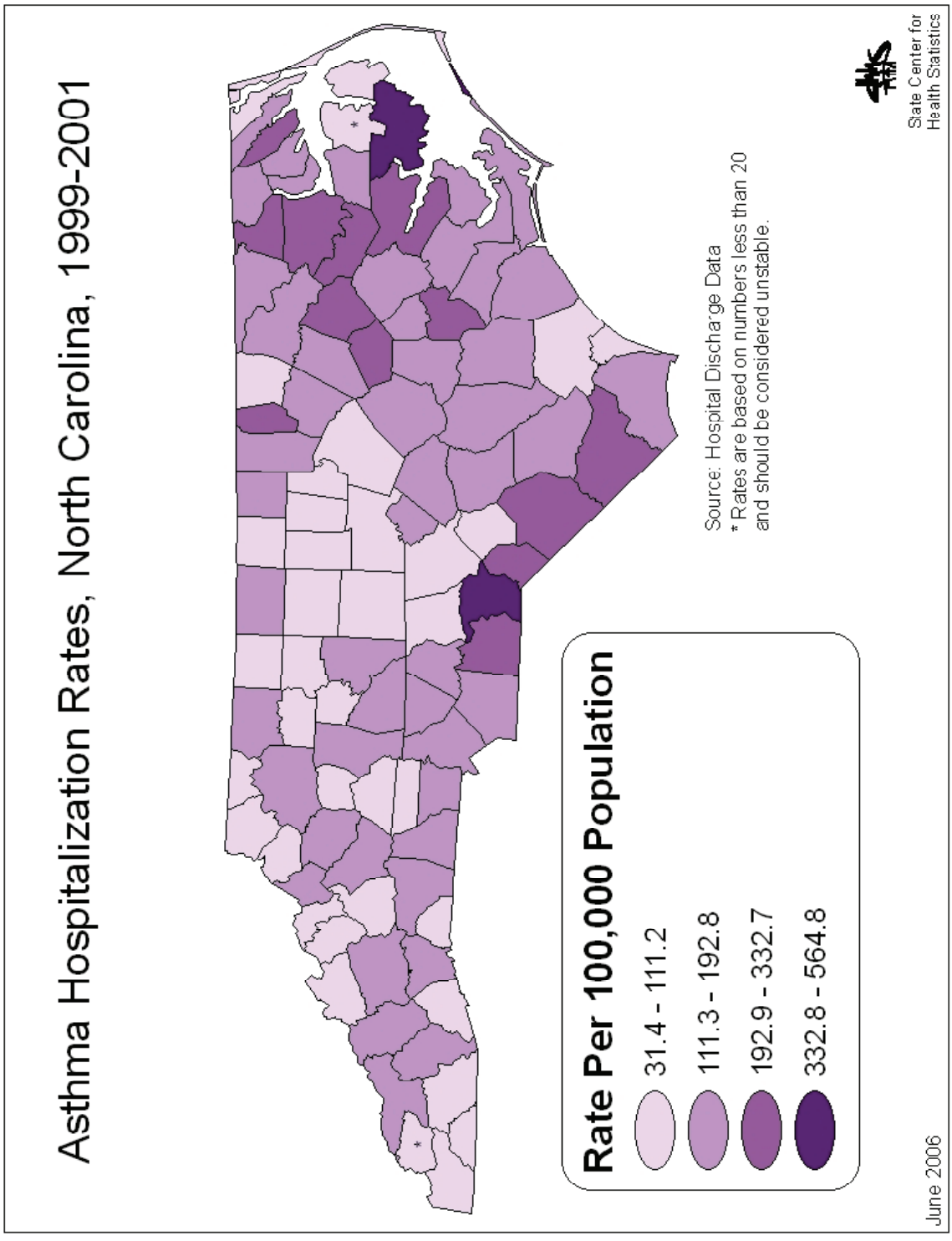
Since the reporting of race is not required for submission of the hospital discharge data to the data processor, values for race have frequently been missing. Patterns for missing race information do not seem to be random, therefore the North Carolina Hospital Discharge data are not cross tabulated by race. Additionally, the Hospital Discharge data do not have variables that reflect ethnicity, with the result that the reporting of data by ethnic origin is impossible. However, National Hospital Discharge data is available and shows large racial and ethnic disparities. Between 1980 and 1999, national asthma hospitalization rates increased significantly more among black children than among white children. In 1998-1999, the asthma hospitalization rate among black children (569 per 100,000) was 3.6 times the rate for white children (155 per 100,000).[41] According to the National Hospital Discharge Survey, in 2002, the asthma hospitalization rate for all African Americans (360 per 100,000) was 225% higher than the asthma hospitalization rate for all whites (110 per 100,000).[12]

County Specific Asthma Hospitalization Data

Hospitalization data by county provides interesting and valuable information concerning the burden of asthma in different counties across North Carolina. This information can be found in Appendix D, Tables 2, 3, and 4.

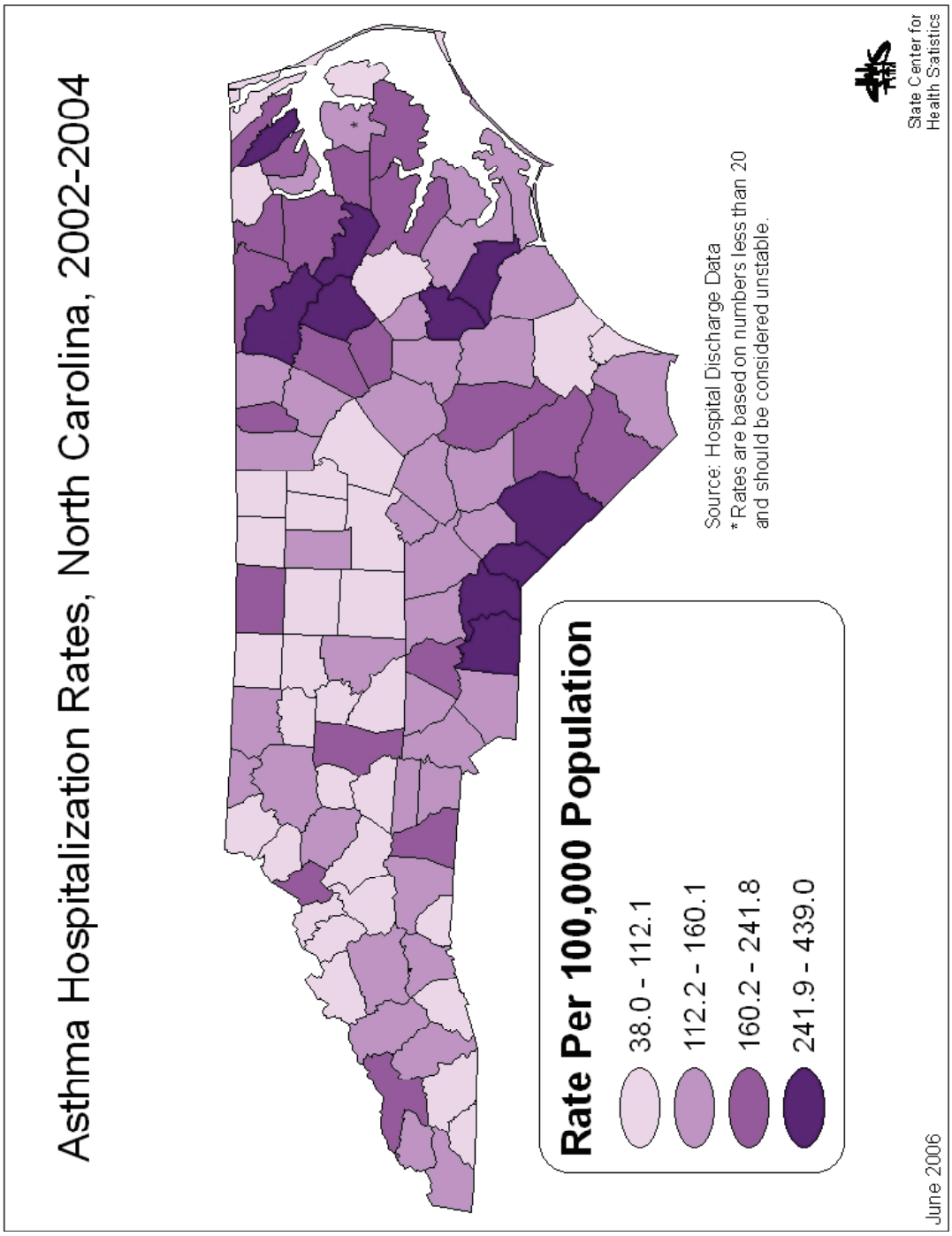
Below are two maps showing asthma hospitalization rates (per 100,000) for all North Carolinians for two time periods. Map 1 looks at total hospitalization rates for the years 1999 through 2001 and Map 2 focuses on the years 2002 through 2004.

Map 1. Hospitalizations[1,2] With a Primary Cause of Asthma per 100,000 Population, by County, North Carolina, 1999-2001



[1]Only includes primary diagnoses of asthma for North Carolina Residents served in North Carolina hospitals
[2]Rates may be smaller than actual asthma-related hospital use for counties that border other states

Map 2. Hospitalizations[1,2] With a Primary Cause of Asthma per 100,000 Population, by County, North Carolina, 2002-2004[3]



[1]Only includes primary diagnoses of asthma for North Carolina Residents served in North Carolina hospitals.
[2]Rates may be smaller than actual asthma-related hospital use for counties that border other states.
[3]2004 data are provisional.

Cost of Asthma

Asthma is a significant economic burden at national, state and local levels. An economic analysis commissioned by the American Lung Association estimated the 2004 annual cost for asthma increased to $16.1 billion from the previous number of $14 billion in 2001.[42, 50]

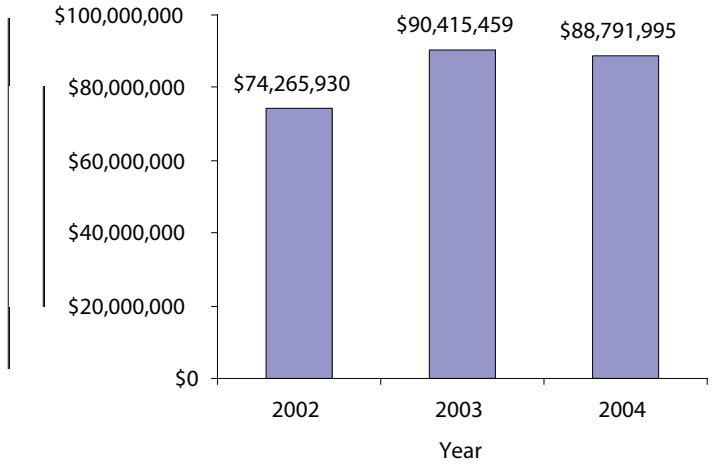
The 2004 American Lung Associations national estimate examined both direct and indirect costs of asthma. Direct costs included physician visits, hospital stays, and medications. Out of the $16.1 billion total estimate, approximately $11.5 billion was attributed to direct costs. Prescription drugs represented the largest single direct medical expenditure, at $5 billion.[56]

Indirect costs included but were not limited to lost work days, school absenteeism, loss of productivity, and lost earnings, all of which were approximated to result in $4.6 billion of the total asthma cost in 2004. This number represented $1.5 million in lost school days, and $1.4 million in loss of work.[42] However, the largest single indirect cost of asthma was loss of productivity due to death, which was estimated at $1.7 billion dollars.[56]

The Agency for Healthcare Research and Quality published the *Asthma Care Quality Improvement: A Resource Guide for State Action in 2006*. In this document, the economic burden of asthma (including direct and indirect costs) was estimated for each of the fifty states. For North Carolina in 2003, direct costs were estimated at over $362 million dollars and indirect costs were estimated at more than $269 million dollars. The total estimated asthma cost for North Carolina for 2003 exceeded $631 million dollars.[42]

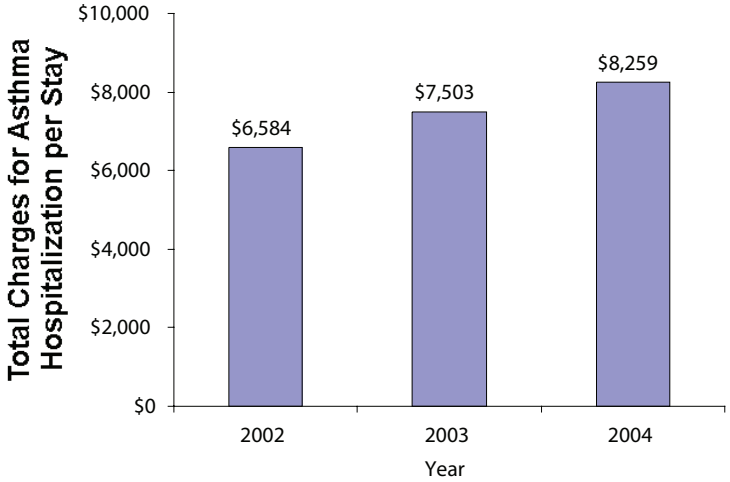
The North Carolina State Center for Health Statistics provided information on the amount billed for hospitalization due to a primary cause of asthma for the years 2002 through 2004. Figure 36 shows the total cost of hospitalizations for a primary diagnosis of asthma for all ages in North Carolina. Figure 37 then presents at the cost of hospitalization per individual stay for a primary diagnosis of asthma.

Figure 37. Total Charges for Hospitalizations for a Primary Diagnosis of Asthma[1,2], All Ages, North Carolina, 2002-2004[3]



[1]ICD-9 diagnostic codes 493.00 through 493.92
[2]Data includes only N.C. residents served in N.C. hospitals. Numbers and rates shown may be smaller than the actual hospital use for counties that border other states.
[3]2004 data provisional.
Data Source: North Carolina State Center for Health Statistics, 2002-2004

Figure 38. Total Charges for Asthma Hospitalizations, per Stay, for a Primary Diagnosis of Asthma[1,2], All Ages, North Carolina, 2002-2004[3]



[1]ICD-9 diagnostic codes 493.00 through 493.92
[2]Data includes only N.C. residents served in N.C. hospitals. Numbers and rates shown may be smaller than the actual hospital use for counties that border other states.
[3]2004 data provisional.
Data Source: North Carolina State Center for Health Statistics, 2002-2004

Table 19. Total Charges Hospitalization For a Primary Diagnosis of Asthma, by Average Charges per Stay and Total Hospital Charges per year, 2002-2004

	Total Discharges	Avg. Length of Stay (days)	Total Hospital Charges	Average Charges per Stay
2002	11,280	3.4	$74,265,930	$6,584
2003	12,051	3.6	$90,415,459	$7,503
2004*	10,753	3.6	$88,791,995	$8,259

*2004 data provisional

Emergency Room Visits

Emergency room visits for asthma are often preventable. The goals of asthma therapy is to control asthma through ongoing and effective management, prevent recurrent exacerbations from asthma, and minimize the need for emergency department and more frequent visits in the medical home for urgent management and care. A visit to the emergency department is often an indication of inadequate long-term management of asthma and/or inadequate plans for management of exacerbations.[16]

In order to decrease the amount of emergency department visits, action plans, education, and other self-management tools need to be provided and reinforced with adults, children, and their families to help them to effectively manage asthma. Research on adults with asthma who were referred by emergency department providers to an asthma education program showed that education can decrease utilization of emergency services.[16]

The 2005 N.C. BRFSS asked adults with current asthma, *"During the past 12 months, how many times did you visit an emergency room or urgent care center because of your asthma?"* Although responses showed less than 25% of adults with current asthma had visited an emergency room or urgent care center for their asthma in the past year, out of those who had visited an emergency room, over half had made multiple visits in the same twelve month period.

Figure 39. How Many Times in the Past 12 Months Have Persons with Asthma Visited an Emergency Room or Urgent Care Center Because of Their Asthma, Adults (≥ 18 years), North Carolina, 2005

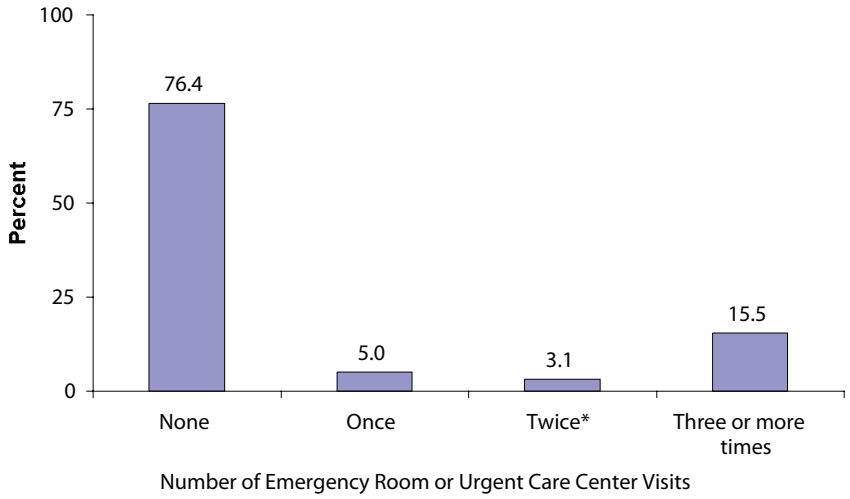


Table 20. Number of Emergency Room or Urgent Care Center Visits, Total and by Race, North Carolina, 2005

	None	Once	Twice	Three or more times
Total %	76.4%	5.0%	3.1%*	15.5%
(95% CI)	(72.7, 79.8)	(3.4, 7.3)	(1.9, 5.0)	(12.7, 18.8)

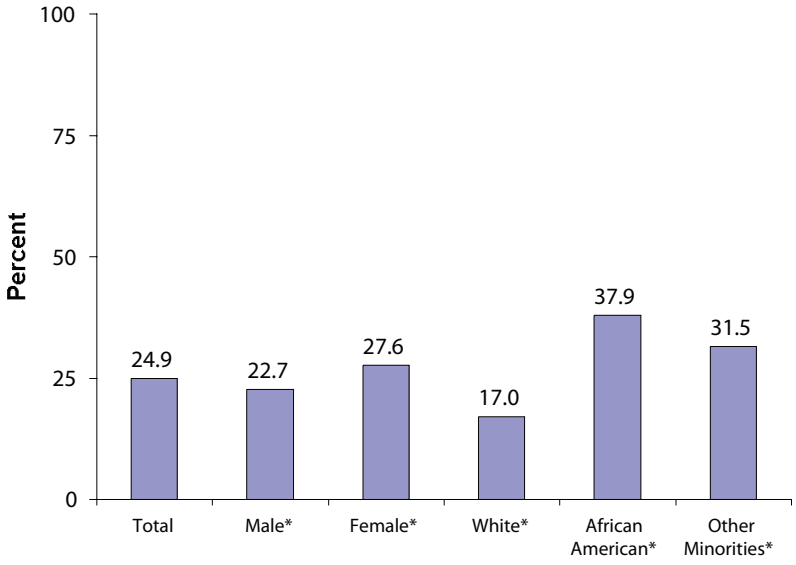
*Based on numerator less than 50, interpret with caution.
Confidence intervals rounded to the nearest tenth
Data Source: BRFSS, North Carolina, 2005

Summary of Figure 39 and Table 20:

- Twenty-three percent of persons with current asthma visited an emergency room or urgent care center at least once because of asthma in the past 12 months.
- Of the 24% who visited an ER or urgent care center in the past 12 months, two-thirds went three or more times. This number is significantly greater than for those who just made one or two visits to the ER or urgent care center.

The 2005 N.C. CHAMP survey asked a similar question about children age 17 and younger with current asthma, *"During the past 12 months, has your child had to visit a hospital emergency room or urgent care clinic because of their asthma?"*

Figure 40. During the Past 12 Months, Did Your Child Visit an Emergency Room or Urgent Care Clinic because of Their Asthma, Children (≤ 17 years), North Carolina, 2005



	Total	Male	Female	White	African American	Other Minorities
%	24.9	22.7*	27.6*	17.0*	37.9*	31.5*
95% CI	19.9-30.7	16.5-30.4	19.9-36.8	11.8-23.7	27.4-49.6	16.9-51.1

*Based on numerator less than 50, interpret with caution.
Confidence intervals rounded to the nearest tenth
Data Source: North Carolina CHAMP, 2005

Summary of Figure 40:

- About 25% of children with current asthma visited the hospital emergency room or urgent care clinic because of their asthma in the past 12 months.
- African American children were more than twice as likely as white children to have visited the hospital emergency room or urgent care clinic because of their asthma.

North Carolina Emergency Department Database

The North Carolina Hospital Emergency Surveillance System (NCHESS) is a statewide surveillance system that collects data from all of the 24 hour access emergency departments attached to hospitals. According to the North Carolina Emergency Department Database (NCEDD) website, data is submitted to the system every 12 hours, where it is stored. Hospital emergency department (ED) visit data offers a unique source of information for public health surveillance, research and clinical operations.[44]

This system has the ability to generate reports based on several different factors, including age or gender of patient, month, day, or time of arrival, chief complaint, and final diagnosis. Asthma is among the many diseases specifically included in this system. Although no asthma emergency department data will be displayed in this document because of the limitation from the fact that all ED's are not currently on line, the NCEDD will play a key role in asthma surveillance in the near future. The state asthma program will have the ability to generate reports on ED visits for a primary diagnosis of asthma based on ICD-9 codes.

For more information on the NCEDD system, visit the website at **http://www.ncedd.org**.

Asthma Medication

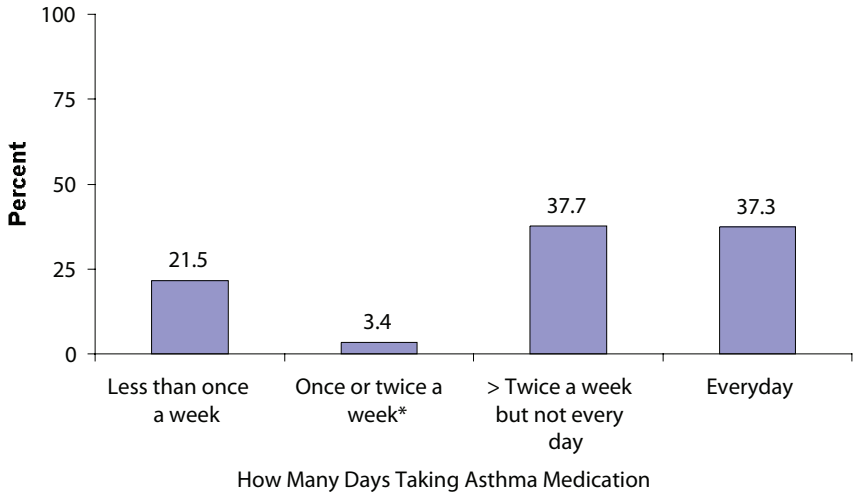
Long-Term Control Medication Usage

The goal of asthma therapy is to achieve and maintain control of asthma. Ideally, this would be accomplished by using the least amount of medications, experiencing the least amount of side effects and experiencing limited to no acute asthma episodes. The daily medications prescribed for long-term asthma control differ according to the severity of the patient's asthma (Table 10 in the Asthma Management and Quality of Life section). Asthma medications can be categorized in two general classes: long-term control medications taken on a daily basis to achieve and maintain control of persistent asthma and quick relief medications used to control acute and often urgent symptoms, which will be discussed later in this chapter.[16] The following figures review daily use of long-term control medications. The following figures 41 and 42 present data on daily use of long-term control medications. According to the 2005 N.C. BRFSS, 37.3% of adults with current asthma and 52.6% of children with current asthma took their asthma medication everyday.

While these questions examine compliance of persons taking long-term asthma medication, it is important to note that persons with current asthma are not distinguished by severity. Therefore, persons with current asthma at the mild intermittent severity level who would not normally receive daily control medication would not be designated as compliant.

Adults

Figure 41. How Many Times in the Past 30 Days Have Persons With Asthma Taken Their Asthma Medication to Prevent an Asthma Attack from Occurring, Adults (≥18 years), North Carolina, 2005



	Less than once a week	Once or twice a week	> Twice a week but not every day	Everyday
%	21.5%	3.4%*	37.7%	37.3%
(95% CI)	(18.4, 25.0)	(2.1, 5.6)	(34.0, 41.7)	(33.5, 41.3)

*Based on numerator less than 50, interpret with caution.
Confidence intervals rounded to the nearest tenth
Data Source: North Carolina BRFSS, 2005

Summary of Figure 41:

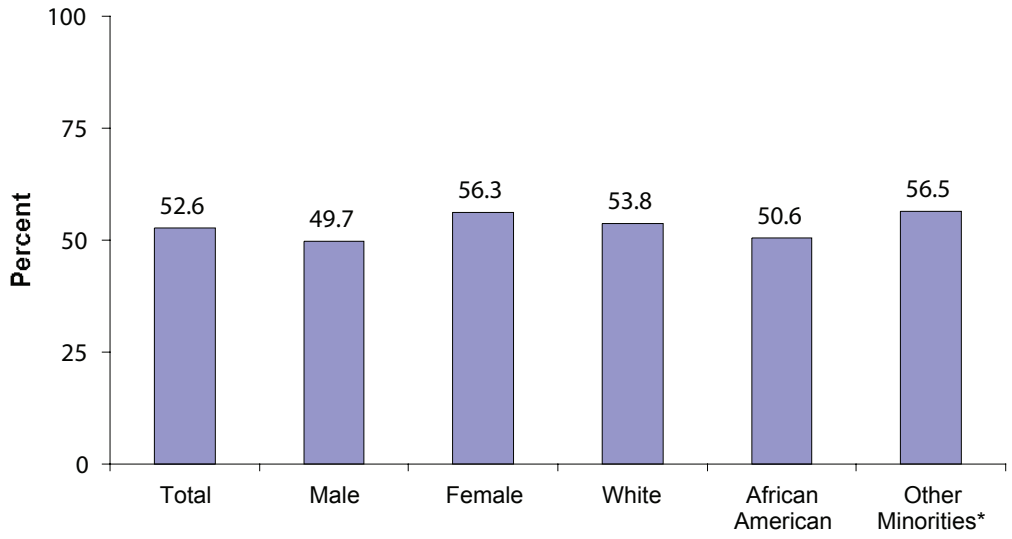
- Only 37.3% of adults with current asthma in North Carolina reported using their medication daily to manage their disease.
- These data are difficult to interpret without knowing the asthma severity or what type of medication that respondents have been prescribed. Some people who do not understand the purpose of their medications may use a medication to prevent an asthma attack which is usually not meant to be used that way.

There are no gender or racial differences noted as to how often North Carolinians with current asthma took their medication to prevent an asthma attack from occurring.

Children

Unlike the BRFSS question that asked adults with asthma how many times a week they took their long-term control medication, the 2005 N.C. CHAMP simply asked *"Is your child using a medicine everyday (such as a Beclovent, Asmacort, Pulmicort, Flovent, Advair, Singulair, or Vanceril inhaler) that was prescribed by a doctor to keep them from having asthma problems?"*

Figure 42. What Percentage of Children With Current Asthma are Using Medicine Every Day That Was Prescribed by a Doctor to Keep Them From Having Asthma Problems, Children (≤ 17 years), North Carolina, 2005



	Total	Male	Female	White	African American	Other Minorities
%	52.6	49.7	56.3	53.8	50.6	56.5*
95% CI	46.6-58.6	41.7-57.8	47.2-65.1	46.2-61.2	39.2-61.9	38.5-73.0

*Based on numerator less than 50, interpret with caution.
Confidence intervals rounded to the nearest tenth
Data Source: CHAMP, North Carolina, 2005

Summary of Figure 42:

- Approximately half of all children in North Carolina with current asthma use a medicine every day that was prescribed by a doctor to keep them from having asthma problems.
- There are no gender or racial differences seen among children who use everyday medication to prevent asthma symptoms.

Additional information that is not currently available, but would be helpful to investigate in the future would include if asthma action plans were being utilized by these persons with current asthma, and how asthma severity affects compliance with the medications prescribed. It would also be interesting to discern if insurance status of the child could be studied and determine if that affected asthma medication compliance.

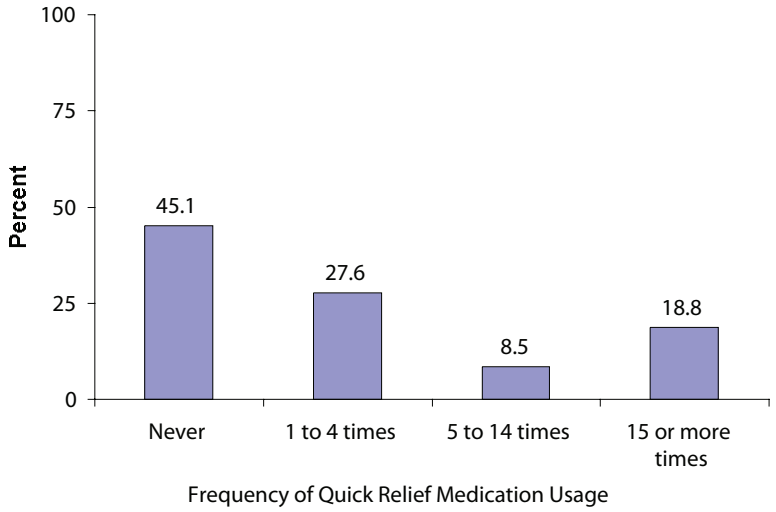
Asthma Quick Relief Medication Usage

Long-term control medications are recommended only for persons with mild persistent, moderate persistent, or severe persistent asthma. Quick relief medications are recommended for all persons with asthma. Quick relief medications are used to provide prompt relief of bronchocontriction and its accompanying acute symptoms such as cough, chest tightness, and wheezing.[16]

Adults

The 2005 N.C. BRFSS asked adults ages 18 and older with current asthma *"During the past 30 days, how often did you use a prescription asthma inhaler during an asthma attack to stop it?"*

Figure 43. How Often in the Past 30 Days Did Persons With Asthma Use a Prescription Asthma Inhaler During an Asthma Attack to Stop it, Adults (≥ 18 years), North Carolina, 2005



	Never	1 to 4 times	5 to 14 times	15 or more times
%	45.1%	27.6%	8.5%	18.8%
(95% CI)	(41.1- 49.2)	(24.0- 31.4)	(6.6-10.7)	(16.1-21.9)

Confidence intervals rounded to the nearest tenth
Data Source: BRFSS, North Carolina, 2005

Summary of Figure 43:

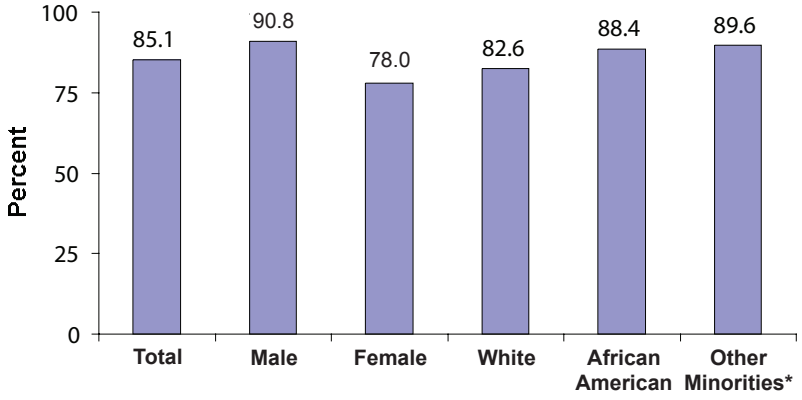
- Fifty-five percent of adults with current asthma have used an inhaler in the past 30 days during an asthma attack to stop it.

Males were more likely (53.8%) to not have used a prescription asthma inhaler in the past 30 days during an asthma attack to stop it than were females (40.7%). There were no significant racial differences in how many times in the past 30 days North Carolinians with current asthma used an inhaler during an asthma attack to stop it.

Children

The 2005 N.C. CHAMP asked *"Does your child use a rescue medication such as Albuterol, Alupent, Ventolin, Proventil, Xopenex or Maxair inhaler?"*

Figure 44. What Percentage of Children With Current Asthma are Using a Rescue Medication, Children (≤ 17 years), North Carolina, 2005



	Total	Male	Female	White	African American	Other Minorities
%	85.1	90.8	78.0	82.6	88.4	89.6*
95% CI	80.3-88.9	85.3-94.4	69.4-84.7	75.8-87.8	79.8-93.6	75.0-96.1

*Based on numerator less than 50, interpret with caution.
Confidence intervals rounded to the nearest tenth
Data Source: CHAMP, North Carolina, 2005

Summary of Figure 44:

- Eighty-five percent of children with current asthma used a rescue medication.
- Males were significantly more likely than females to use a rescue medication.

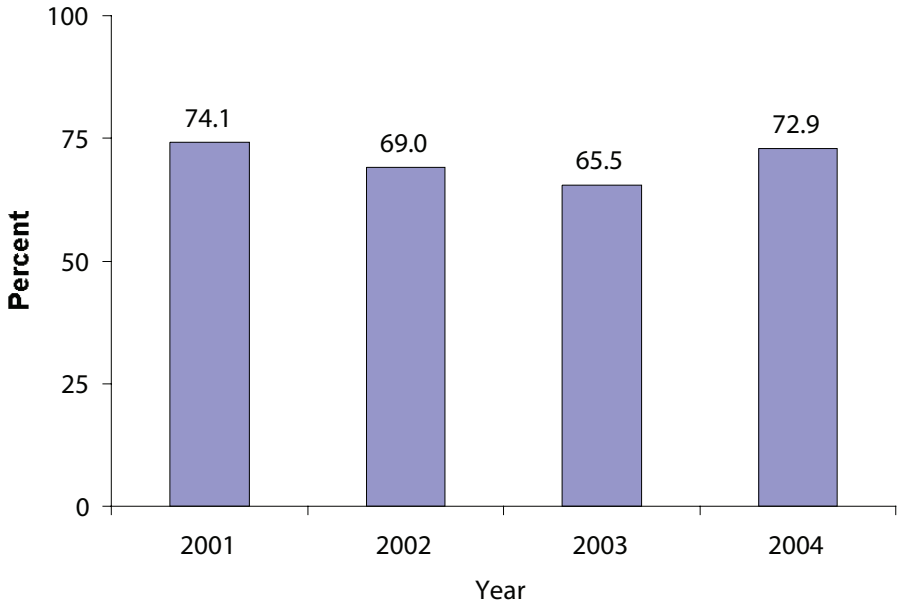
HEDIS Measures

The Health Plan Employer Data and Information Set, or HEDIS, is a set of standardized performance measures designed to ensure that purchasers and consumers have the information they need to reliably compare the performance of managed health care plans (including Medicaid). HEDIS is sponsored, supported and maintained by the National Committee for Quality Assurance (NCQA).The performance measures in HEDIS are related to many significant public health issues and include asthma.[45]

The specific HEDIS measure related to asthma is the Use of Appropriate Medications for People with Asthma. This measure specifically looks at the percentage of enrolled members five to 56 years of age during the measurement year who were identified as having persistent asthma during the year prior to the measurement year and who were appropriately prescribed medication during the measurement year. This process measure evaluates whether members with persistent asthma are prescribed medications that are acceptable as primary therapy for long term asthma control.[46] (Please note that this is the description for the HEDIS measure for the study year 2004. Specifications are subject to change every year.)

Figure 45 denotes the use of appropriate medications for persons continuously enrolled in Medicaid with persistent asthma by year. The years 2002 and 2003 demonstrated decreases in the percentage of persons with persistent asthma who were on Medicaid and receiving appropriate medications; however in 2004 there was a 7.4% increase.

Figure 45. Use of Appropriate Medications[1] for Persons Continuously Enrolled in Medicaid with Persistent Asthma[2] , North Carolina, 2001–2004



[1]While there are a number of acceptable therapies for people with persistent asthma, the best available evidence indicates that inhaled corticosteroids are the preferred primary therapy.[46]
[2]NCQA standards for "persistent asthma" within the Medicaid population defined as: 1) four or more prescription medications used in the treatment of asthma in a year, OR 2) One or more inpatient hospital visits with a primary diagnosis of asthma in a year, OR 3) One or more ED visits with a primary diagnosis of asthma in a year, OR 4) Four or more outpatient visits with asthma listed anywhere as one of the diagnosis AND two or more claims for prescription drugs used in the treatment of asthma within one year.
Data Source: North Carolina DMA HEDIS Reports, 2002 – 2005

Key Findings From This Chapter

- About forty-five percent of North Carolina adults with current asthma have not seen a doctor or health professional for a routine checkup for their asthma in the past 12 months.[52]
- In 2004, females in North Carolina had a significantly asthma higher hospitalization rate (158 per 100,000) than males (92.8 per 100,000).
- In 2004, the highest asthma hospitalization rates in North Carolina occurred in the youngest age group, ages 0-4 years (312.7 per 100,000). The rates then steadily decreased through middle age, and then began increasing again in the 65+ age group to an asthma hospitalization rate of 210.2 per 100,000.
- Almost a quarter (23.6%) of adults with current asthma in North Carolina visited an ER or urgent care center in the past 12 months. Of that 23.6%, two-thirds went three or more times.
- Almost 25% of children with current asthma in North Carolina visited the hospital emergency room or urgent care clinic because of their asthma in the past 12 months. In North Carolina, African American children were more than twice as likely as white children to have visited the hospital emergency room or urgent care clinic because of their asthma.[53]
- In 2004, total charges for hospitalizations in North Carolina for a primary diagnosis of asthma exceeded $88 million dollars. This represented an average charge of $8,259 per asthma hospitalization stay.